Claims

1. An automatic system (10) for taking of a fluid sample from a sample site (SS) of a living test object, comprising:

- catheter means (C_A, C_B) comprising a three-way junction (C_J) configured to be located in proximity to said sample site (SS), said three-way junction (CJ) is connected to a first catheter means (C_A), a second catheter means (C_B) and a sample-taking end (C_{TE});

- a valve (V_{A2}) connected to said first catheter means (C_A), said valve (V_{A2}) having an inlet (V_I) for an immiscible fluid to be aspirated into said first catheter means (C_A); and

- pumping means (P_A, P_B) connectable to said catheter means (C_A, C_B) and configured to aspirate an amount of said immiscible fluid (AB) into said first catheter means (C_A) and to move said amount of said immiscible fluid (AB) to said three-way junction (C_J) and arrange a first part (AB_1) of said immiscible fluid (AB) in a part of said second catheter means (C_B) and a second part (AB_2) of said immiscible fluid in a part of said first catheter means (C_A); whereby said first (AB_1) and second (AB_2) parts of said immiscible fluid (AB) being configured to separate a taken sample (TS) from the rinsing fluid.

2. The system as recited in claim 1, wherein said pumping means (P_A, P_B) further being configured to control the flow rate and the flow direction of a fluid comprised in said catheter means (C_A, C_B) such that said fluid flow can pass by said sample-taking end (C_{TE}) when flowing from one of the first and second catheter means (C_A, C_B) to the other.

3. The system as recited in claim 1 or 2, wherein said sample-taking end (C_{TE}) is configured to be placed at said sample site (SS), wherein said pumping means (P_A, P_B) being configured to move said first part (AB_1) of said immiscible fluid (AB) towards an end opening of said sample-taking end (C_{TE}) and to take a fluid sample when said first part (AB_1) is located at the end opening, and wherein said pumping means (P_A, P_B) is configured to transport said taken sample (TS) from said sample-taking end (C_{TE}) to a sample-delivery end (C_{DE}) configured to deliver said taken sample (TS) to a sample tube (T).

4. The system as recited in any of the preceding claims, further comprising a plurality of valves (V_{A1}, V_{A2}, V_{B1}, V_{B2}, V_{B3}, V_{B4}) arranged at said catheter means (C_A, C_B) and

configured to control the flow path of said fluid in said catheter means (C_A, C_B).

5. The system as recited in claim 4, further comprising a control unit (CU) connectable to said pumping means (P_A, P_B) and said plurality of valves (V_{A1}, V_{A2}, V_{B1}, V_{B2}, V_{B3}, V_{B4}) and configured to control the operation of said pumping means (P_A, P_B) and said plurality of valves (V_{A1}, V_{A2}, V_{B1}, V_{B2}, V_{B3}, V_{B4}).

6. The system as recited in any of the preceding claims, wherein said catheter means (C_A, C_B) comprises a double lumen catheter means..

7. The system as recited in any of the preceding claims, further comprising a source of a rinsing fluid (F_A, F_B) connectable to said catheter means (C_A, C_B) and configured to supply a rinsing fluid from said source (F_A, F_B) to said catheter means (C_A, C_B);

8. The system as recited in claim 7, wherein said pumping means (P_A, P_B) are configured to provide a flow of rinsing fluid from said source (F_A, F_B) of rinsing fluid through said catheter means (C_A, C_B) to a waste tube at the delivery end (C_{DE}) of said catheter means (C_B).

9. The system as recited in claim 8, wherein the flow of rinsing fluid is accomplished by means of a first pumping means (P_A) providing a pushing action equal to a suction action provided by a second pumping means (P_B), whereby the rinsing fluid will pass by said sample-taking end (CE) without entering it when flowing from said first catheter means (C_A) to said second catheter means (C_B).

10. The system as recited in claim 8, wherein the flow of rinsing fluid is accomplished by means of a first pumping means (P_A) pushing with a slightly higher pressure than a second pumping means (P_B) is sucking, whereby a part of the rinsing fluid enters and rinses said sample-taking end (C_{TE}) of the catheter means (C_A, C_B).

11. The system as recited in claim 10, wherein said sample-taking end (C_{TE}) is rinsed by means of said first pumping means (P_A) pushing at 100% of a flow F and said second pumping means (P_B) sucking at 90% of said flow F.

12. The system as recited in any of the preceding claims, wherein said pumping means (P_A, P_B) is configured as one single double-acting suction and force pumping means with a first part (P_A) having the capability of providing a pushing action and a second part (P_B) having the capability of providing a suction action, or vice versa, and wherein said first and second parts (P_A, P_B) further being configured to operate simultaneously or separately.

13. The system as recited in claim 12, further comprising a third pumping means configured to operate when the first and second parts of said double-acting suction and force pumping means (P_A, P_B) are operated separately and to compensate for the action of the active one of said first (P_A) and second parts (P_B).

14. The system as recited in any of the preceding claims, further comprising analysing means (AM) configured to analyse said taken fluid sample (TS).

15. The system as recited in any of the preceding claims, further comprising a source of a drug solution connectable to said catheter means (C_A, C_B), said pumping means (P_A, P_B) being configured to transport an amount of said drug to said sample-taking end (C_{TE}) and supply said a drug to said sample site (SS).

16. A method for automatic taking of a fluid sample from a sample site (SS) of a living test object, comprising the steps of:

- supplying a rinsing fluid to a catheter means (C_A, C_B) (step 100);
- aspirating an amount of an immiscible fluid (AB) into the catheter means (C_A, C_B) (step 102);
- moving said amount of said immiscible fluid (AB) to a three-way junction (C_J) of said catheter means (C_A, C_B) (step 104);
- moving a first part (AB_1) of said immiscible fluid (AB) towards an opening of a sample-taking end (C_{TE}) (step 106);
- withdrawing a fluid sample (TS) (step 108);
- arranging a second part (AB_2) of said immiscible fluid (AB) after said taken sample (TS) (step 110);
- moving said taken sample (TS) in said catheter means (C_A, C_B) to a sample-delivery end (C_{DE}) at a sample tube (T) (step 112);

delivering said taken sample (TS) to said sample tube (T) (step 114); and

- rinsing the lumens of said catheter means (C_A, C_B) by providing a flow of rinsing fluid through said catheter means (C_A, C_B) (step 116).

17. A computer program product for use in an automatic system for taking of a fluid sample from a sample site (SS) of a living test object said computer program product comprising computer code portions configured to realise means and functions of any of the preceding claims.

18. A set of disposables for use in an automatic system for taking of a fluid sample from a sample site (SS) of a living test object according to any of the claims 1 – 15.